

(12) **United States Patent**
Twomey

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(54) **CLIP-OVER DISPOSABLE ASSEMBLY FOR USE WITH HEMOSTAT-STYLE SURGICAL INSTRUMENT AND METHODS OF MANUFACTURING SAME**

A61B 18/1442; A61B 2017/0023; A61B 2018/00928; A61B 2018/1495
See application file for complete search history.

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This patent is subject to a terminal disclaimer.

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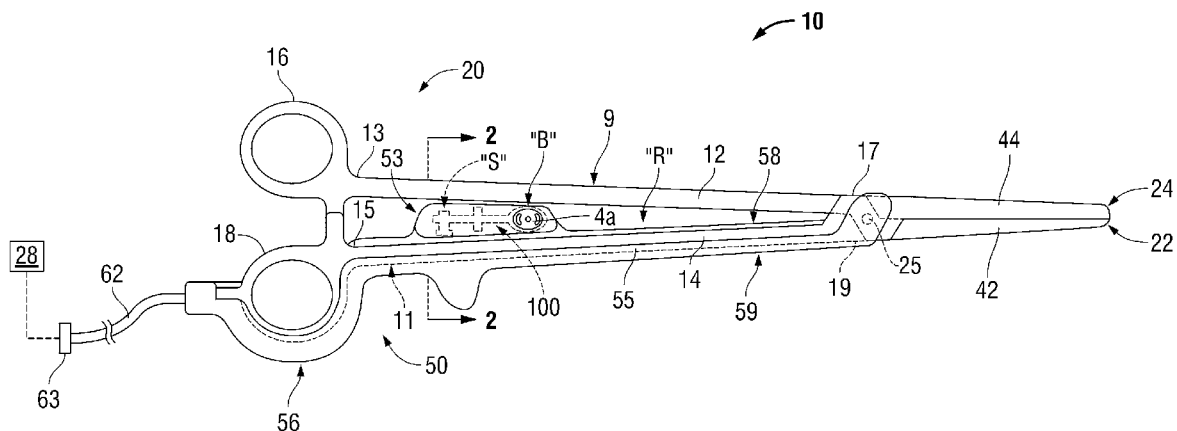
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ABSTRACT

A clip-over disposable assembly includes a switch assembly and a disposable body. The disposable body includes a first disposable member, a second disposable member including first and second wall portions, and a third disposable member. The first wall portion defines a first aperture therethrough and a first cavity configured to receive therein a first portion of the switch assembly. The third disposable member includes a third wall portion, wherein a body of the second disposable member and the third wall portion define an opening configured to allow a shaft of a hemostat-style surgical instrument to pass therethrough. The second wall portion and the third wall portion cooperatively define a chamber in communication with the opening and configured to receive therein at least a portion of the shaft of the hemostat-style surgical instrument, wherein the at least a portion of the shaft is received in the chamber from an off-axis position.

19 Claims, 5 Drawing Sheets



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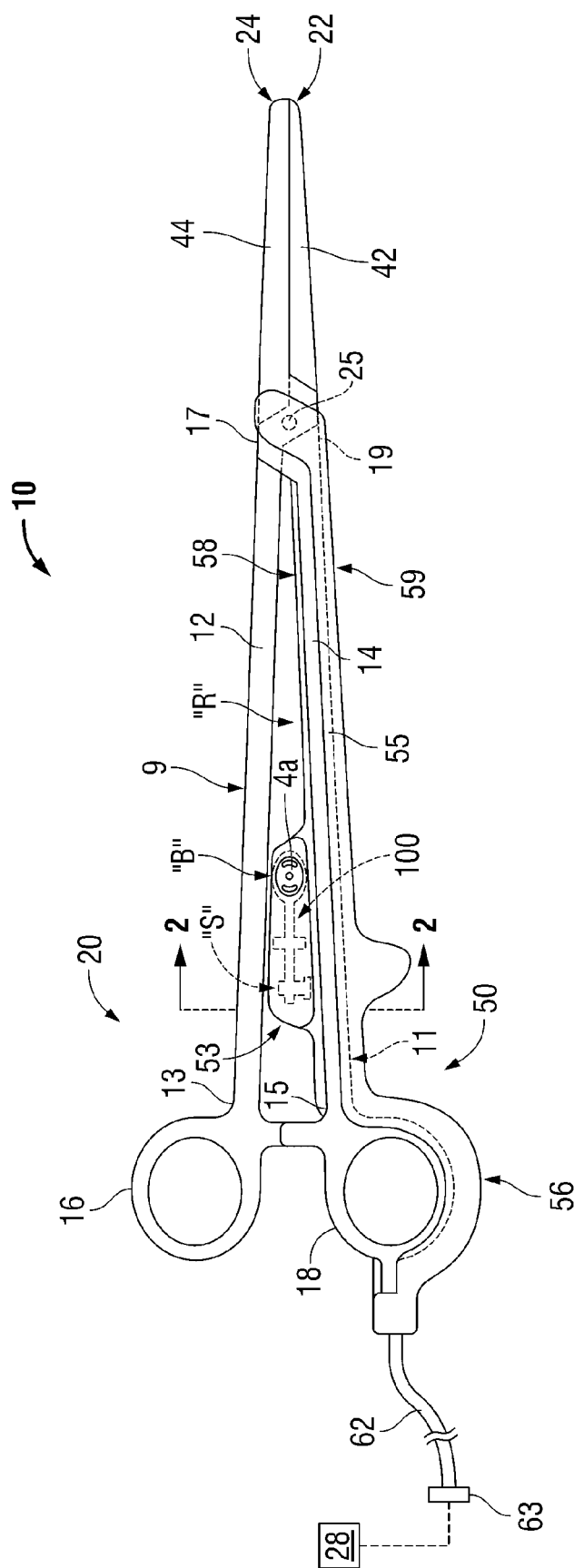


FIG. 1

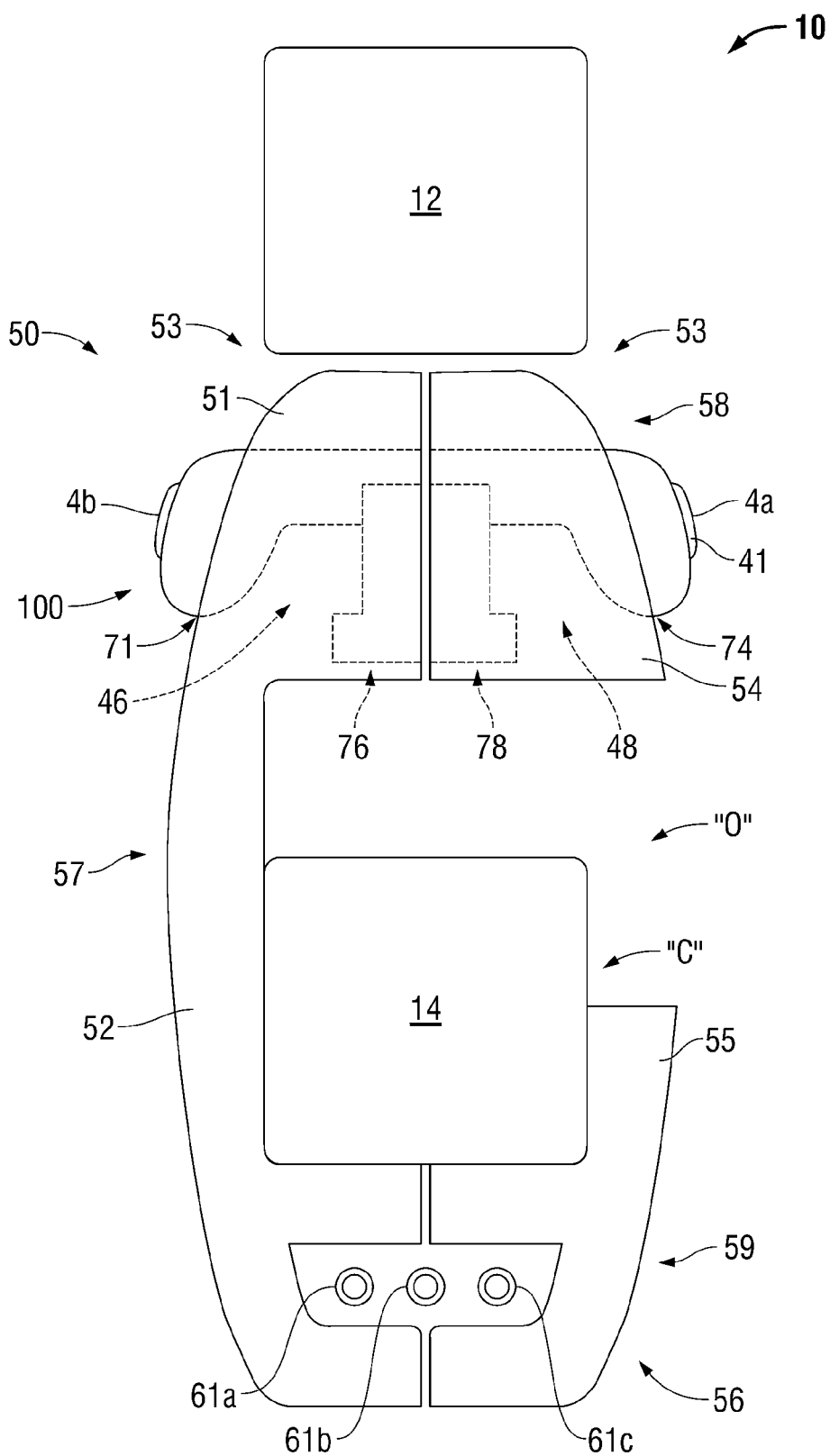


FIG. 2

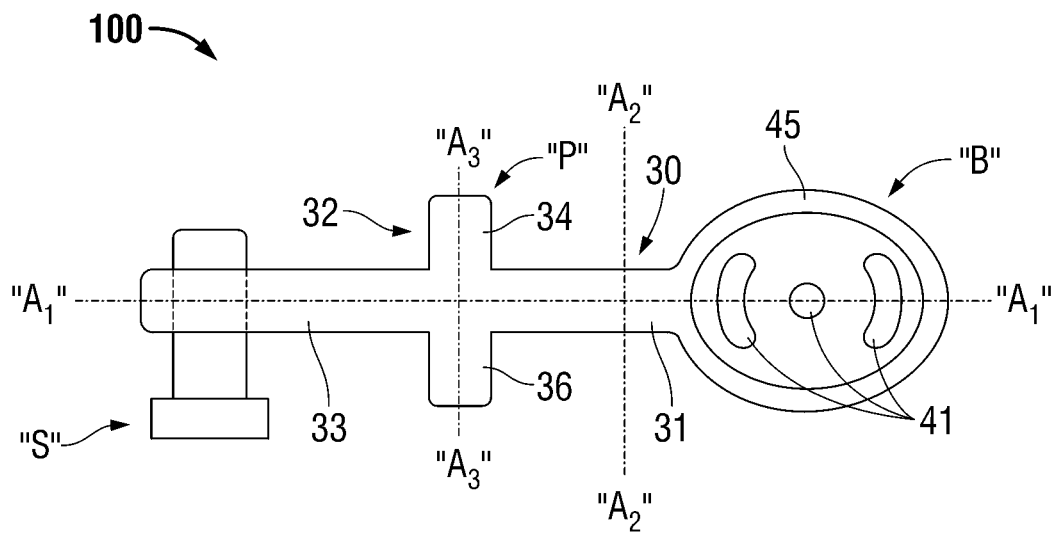


FIG. 3

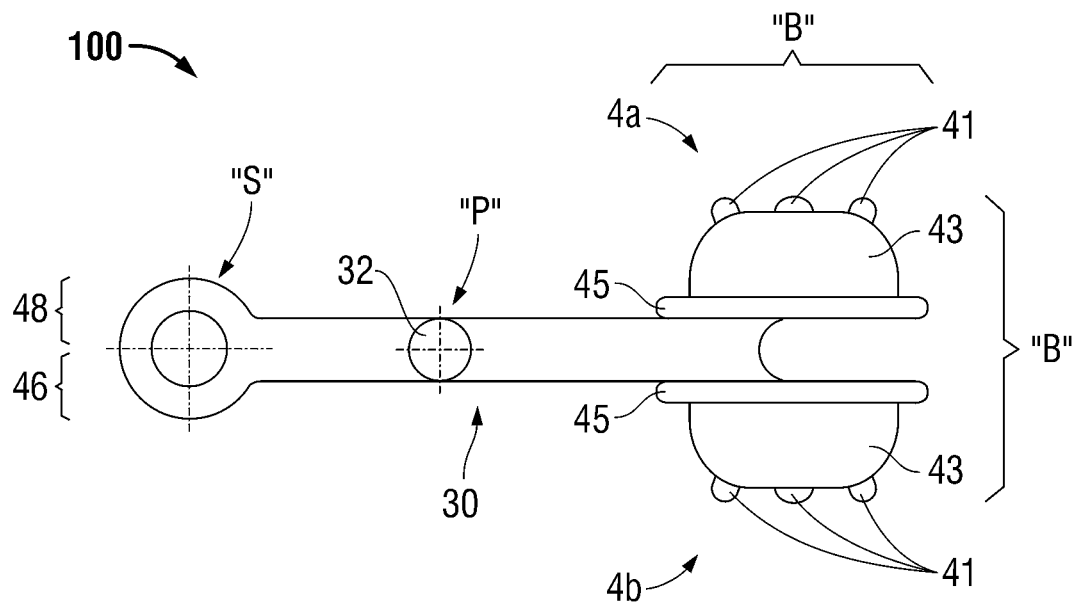
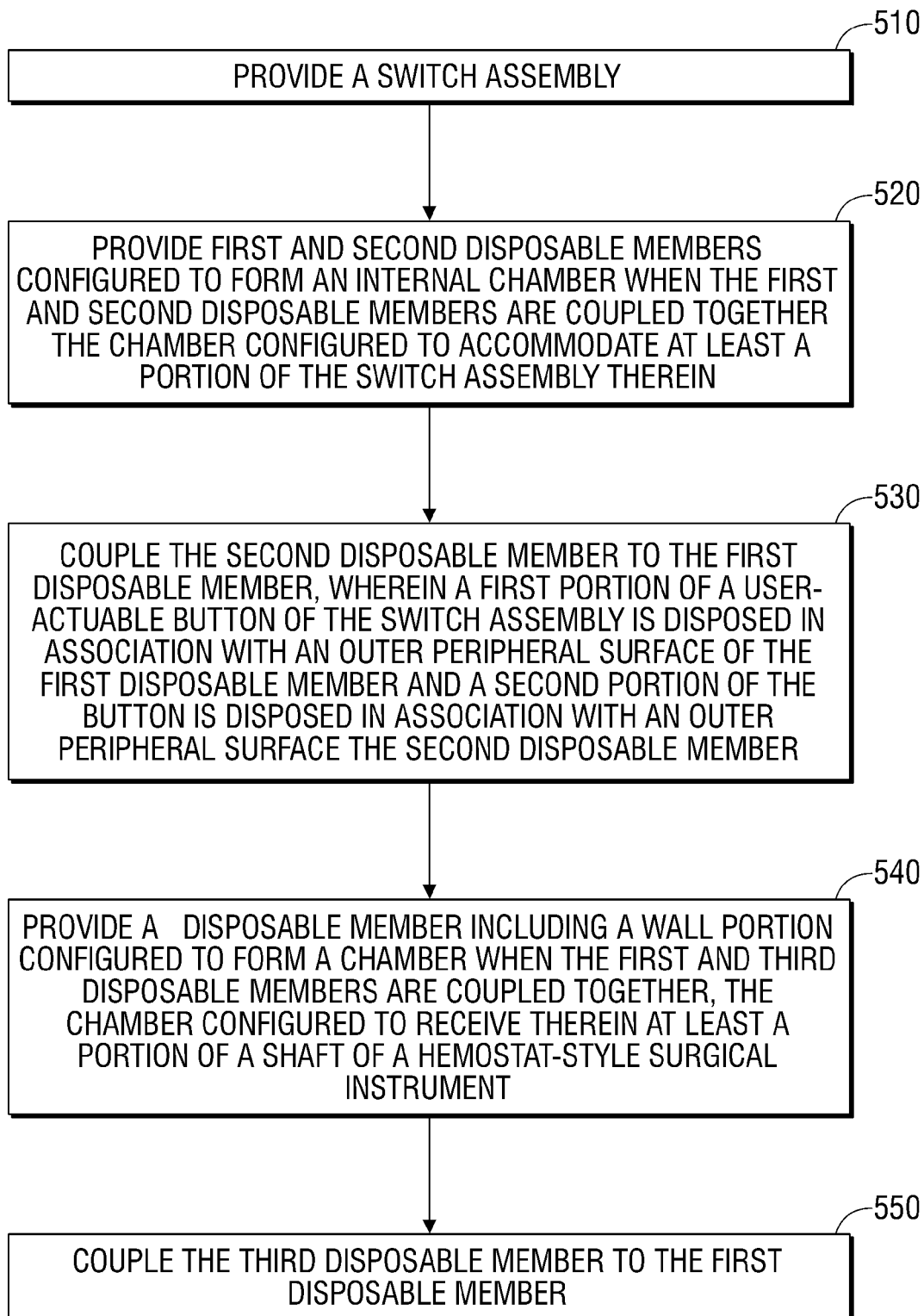


FIG. 4

**FIG. 5**

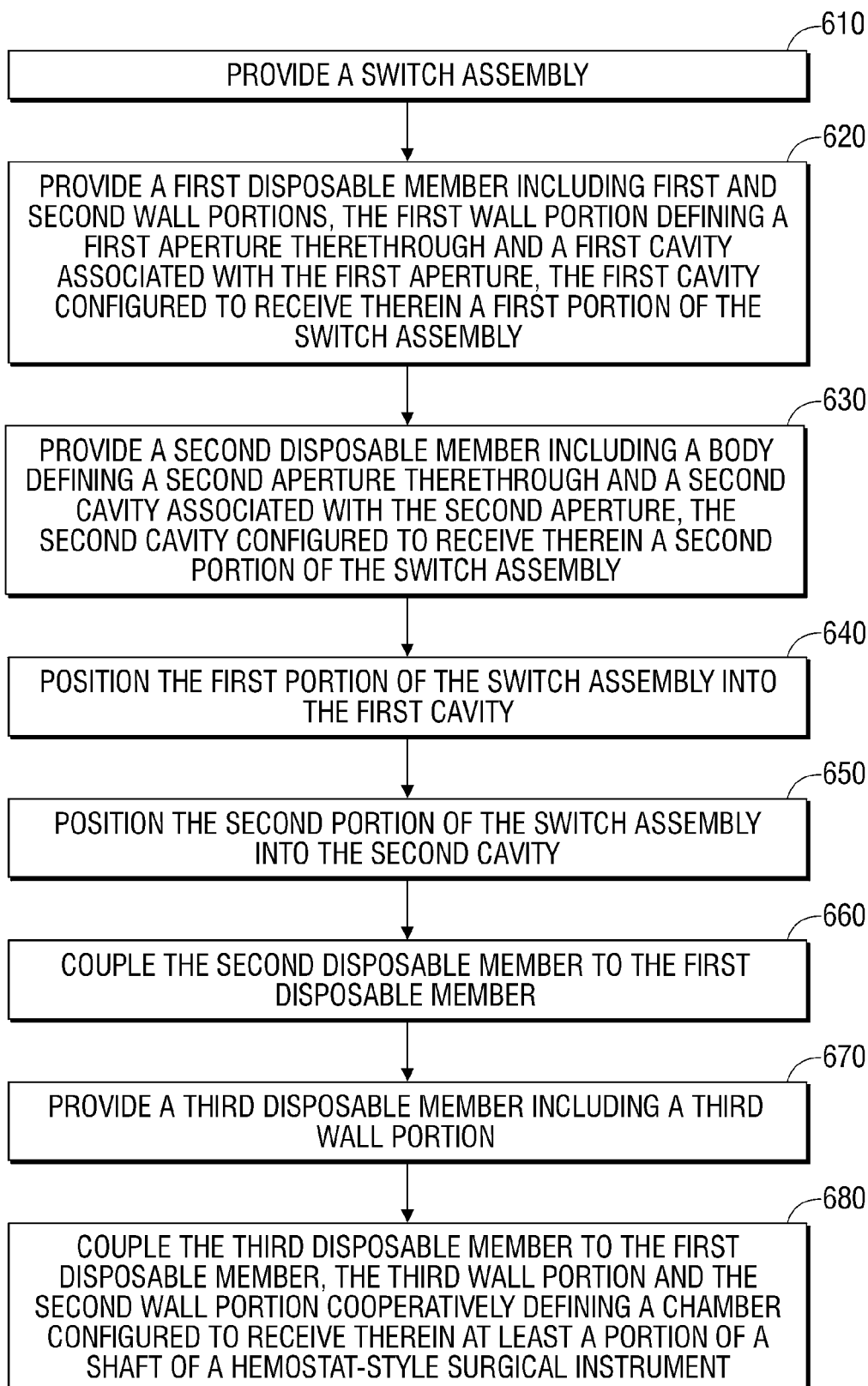


FIG. 6

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**CLIP-OVER DISPOSABLE ASSEMBLY FOR
USE WITH HEMOSTAT-STYLE SURGICAL
INSTRUMENT AND METHODS OF
MANUFACTURING SAME**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

The present application is a continuation application of U.S. patent application Ser. No. 13/183,856 filed on Jul. 15, 2011, now U.S. Pat. No. 8,888,771, the entire contents of which are incorporated herein by reference.

BACKGROUND

1. Technical Field

The present disclosure relates to electrosurgical instruments and, more particularly, to a clip-over disposable assembly for use with a hemostat-style surgical instrument, such as a bipolar forceps, and methods of manufacturing a clip-over disposable assembly.

2. Discussion of Related Art

Electrosurgery involves the application of thermal and/or electrical energy, such as radiofrequency energy, to coagulate, cauterize, cut and/or seal tissue. Electrosurgical devices have been developed for a variety of uses and applications.

Generally, the electrical configuration of electrosurgical devices can be categorized in two classifications: 1) monopolar electrosurgical devices; and 2) bipolar electrosurgical devices. Monopolar electrosurgical devices utilize one electrode associated with a cutting and/or cauterizing instrument and a remote return electrode, usually adhered externally to the patient. Bipolar devices utilize two generally opposing electrodes of a tissue treating portion (e.g., end effector) of an instrument, wherein the electrical current is generally limited to tissue disposed between the two electrodes.

A hemostat or forceps is a surgical device configured to use mechanical action between its jaws to constrict vessels and is commonly used in open surgical procedures to grasp, dissect and/or clamp tissue. Some hemostat-style surgical instruments, such as monopolar electrosurgical forceps and bipolar electrosurgical forceps, utilize both mechanical clamping action and electrosurgical energy to effect hemostasis by heating tissue and blood vessels to coagulate, cauterize, cut and/or seal tissue. By utilizing an electrosurgical forceps, a surgeon can cauterize, coagulate, desiccate and/or cut tissue and/or simply reduce or slow bleeding, by controlling the intensity, frequency and duration of the electrosurgical energy applied to tissue.

Monopolar electrosurgical forceps utilize one active electrode associated with the clamping end effector to deliver energy from an electrosurgical generator to tissue and a remote patient return electrode, usually positioned on the patient's thigh or back, to complete the electrical circuit between the electrosurgical generator and the patient. When electrosurgical energy is applied, the energy travels from the active electrode, to the surgical site, through the patient and to the return electrode.

Bipolar electrosurgical forceps utilize two electrodes, usually disposed on the inner facing or opposing surfaces of end effectors, which are, in turn, electrically coupled to an electrosurgical generator. Each electrode is charged to a different electric potential. When the end effectors are utilized to clamp or grasp tissue therebetween, the electrical energy can be selectively transferred from one electrode, through the intervening tissue to the other electrode.

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In the use of many prior art electrosurgical instruments, cleaning and sterilizing is often impractical as electrodes and/or insulation can be damaged. It is known that electrically insulative materials, such as plastics, can be damaged or compromised by repeated sterilization cycles. To prolong the useful life of electrosurgical instruments, portions of an instrument may be disposable to allow the instrument to be used and sterilized a greater number of times.

SUMMARY

The present disclosure relates to a clip-over disposable assembly suitable for use with a hemostat-style surgical instrument. The clip-over disposable assembly includes a switch assembly and a disposable body configured for side-mounting onto the hemostat-style surgical instrument. The disposable body includes a first disposable member, a second disposable member and a third disposable member. The first disposable member includes first and second wall portions. The first wall portion defines a first aperture therethrough and a first cavity associated with the first aperture. The first cavity is configured to receive therein a first portion of the switch assembly. The second disposable member includes a body defining a second aperture therethrough and a second cavity associated with the second aperture. The second cavity is configured to receive therein a second portion of the switch assembly. The third disposable member includes a third wall portion, wherein the body of the second disposable member and the third wall portion define an opening configured to allow the shaft of the hemostat-style surgical instrument to pass therethrough, and wherein the second wall portion of first disposable member and the third wall portion cooperatively define a chamber in communication with the opening. The chamber is configured to receive therein at least a portion of the shaft of the hemostat-style surgical instrument, wherein the at least a portion of the shaft is received in the chamber from an off-axis position.

The present disclosure also relates to an electrosurgical instrument including a hemostat-style surgical instrument and a clip-over disposable assembly adapted to be releasably attachable to the hemostat-style surgical instrument. The clip-over disposable assembly includes a switch assembly, a first disposable member, a second disposable member, and a third disposable member. The first disposable member includes first and second wall portions. The first wall portion defines a first aperture therethrough and a first cavity associated with the first aperture. The first cavity is configured to receive therein a first portion of the switch assembly. The second disposable member includes a body defining a second aperture therethrough and a second cavity associated with the second aperture. The second cavity is configured to receive therein a second portion of the switch assembly. The third disposable member includes a third wall portion, wherein the third wall portion and the second wall portion cooperatively define a chamber configured to receive therein at least a portion of a shaft of the hemostat-style surgical instrument.

The present disclosure also relates to a method of manufacturing a clip-over disposable assembly including the initial steps of providing a switch assembly, and providing first and second disposable members configured to form an internal chamber when the first and second disposable members are coupled together. The chamber is configured to accommodate at least a portion of the switch assembly therein. The method also includes the steps of coupling the second disposable member to the first disposable member, wherein a first portion of a user-actuable button of the switch assembly is disposed in association with an outer peripheral surface of the first

disposable member and a second portion of the user-actuable button is disposed in association with an outer peripheral surface the second disposable member, and providing a third disposable member including a wall portion configured to form a chamber when the first and third disposable members are coupled together, wherein the chamber configured to receive therein at least a portion of a shaft of a hemostat-style surgical instrument, and coupling the third disposable member to the first disposable member.

The present disclosure also relates to a method of manufacturing a clip-over disposable assembly including the initial steps of providing a switch assembly, providing a first disposable member, and providing a second disposable member. The first disposable member includes first and second wall portions. The first wall portion defines a first aperture therethrough and a first cavity associated with the first aperture. The first cavity is configured to receive therein a first portion of the switch assembly. The second disposable member includes a body defining a second aperture therethrough and a second cavity associated with the second aperture. The second cavity is configured to receive therein a second portion of the switch assembly. The method also includes the steps of positioning the first portion of the switch assembly into the first cavity, positioning the second portion of the switch assembly into the second cavity, coupling the second disposable member to the first disposable member, providing a third disposable member including a third wall portion, and coupling the third disposable member to the first disposable member, wherein the third wall portion and the second wall portion cooperatively define a chamber configured to receive therein at least a portion of a shaft of a hemostat-style surgical instrument.

BRIEF DESCRIPTION OF THE DRAWINGS

Objects and features of the presently-disclosed clip-over disposable assembly for use with a hemostat-style surgical instrument and methods of manufacturing a clip-over disposable assembly will become apparent to those of ordinary skill in the art when descriptions of various embodiments thereof are read with reference to the accompanying drawings, of which:

FIG. 1 is a side view of a bipolar forceps in accordance with an embodiment of the present disclosure;

FIG. 2 is an enlarged, cross-sectional view taken along line 2-2 of FIG. 1;

FIG. 3 is a top view of a switch assembly in accordance with an embodiment of the present disclosure;

FIG. 4 is a side view of the switch assembly of FIG. 3 in accordance with an embodiment of the present disclosure;

FIG. 5 is a flowchart illustrating a method of manufacturing a clip-over disposable assembly in accordance with an embodiment of the present disclosure; and

FIG. 6 is a flowchart illustrating a method of manufacturing a clip-over disposable assembly in accordance with another embodiment of the present disclosure.

DETAILED DESCRIPTION

Hereinafter, embodiments of the presently-disclosed clip-over disposable assembly for use with a hemostat-style surgical instrument and methods of manufacturing a clip-over disposable assembly are described with reference to the accompanying drawings. Like reference numerals may refer to similar or identical elements throughout the description of the figures. As shown in the drawings and as used in this description, and as is traditional when referring to relative

positioning on an object, the term “proximal” refers to that portion of the apparatus, or component thereof, closer to the user and the term “distal” refers to that portion of the apparatus, or component thereof, farther from the user.

As it is used in this description, “transmission line” generally refers to any transmission medium that can be used for the propagation of signals from one point to another.

Various embodiments of the present disclosure provide electrosurgical instruments suitable for sealing, cauterizing, coagulating/desiccating and/or cutting vessels and vascular tissue. Embodiments may be implemented using electromagnetic radiation at microwave frequencies or at other frequencies.

Various embodiments of the presently-disclosed electrosurgical instrument including a hemostat-style surgical instrument and a clip-over disposable assembly are suitable for use with open and/or laparoscopic surgical procedures. Although the following description describes the use of a bipolar forceps, the teachings of the present disclosure may also apply to a monopolar forceps, or other suitable type of hemostat-style surgical instrument.

FIG. 1 shows a bipolar forceps 10 according to an embodiment of the present disclosure that includes a mechanical forceps 20 and a clip-over assembly 50. Clip-over assembly 50 is configured to accommodate a switch assembly 100, partly shown by phantom lines in FIG. 1. An embodiment of a switch assembly, such as the switch assembly 100 of FIG. 1, in accordance with the present disclosure, is shown in more detail in FIGS. 3 and 4. It will be understood, however, that other switch assembly embodiments may also be used. Clip-over assembly 50, which is described in more detail later in this disclosure, is generally configured to be releasably attachable to the mechanical forceps 20.

Mechanical forceps 20 includes first and second members 9 and 11. First and second members 9 and 11 each include an elongated shaft 12 and 14, respectively. Shafts 12 and 14 each include a proximal end 13 and 15 and a distal end 17 and 19, respectively. Each proximal end 13, 15 of each shaft portion 12, 14 includes a handle member 16 and 18, respectively, attached thereto to allow a user to effect movement of at least one of the shaft portions 12 and 14 relative to one another. Extending from the distal end 17 and 19 of each shaft portion 12 and 14 are end effectors 22 and 24, respectively. End effectors 22 and 24 are movable relative to one another in response to movement of the handle members 16 and 18.

In some embodiments, as shown in FIG. 1, shaft portions 12 and 14 are affixed to one another at a point proximate the end effectors 22 and 24 about a pivot 25 such that movement of the handle members 16 and 18 impart movement of the end effectors 22 and 24 from an open configuration, wherein the end effectors 22 and 24 are disposed in spaced relation relative to one another, to a clamping or closed configuration, wherein the end effectors 22 and 24 cooperate to grasp tissue therebetween. In alternative embodiments not shown, the forceps 10 can be designed such that movement of one or both of the handle members 16 and 18 will only cause one of the end effectors, e.g., 22, to move with respect to the other end effector, e.g., 24.

End effector 24 generally includes an upper or first jaw member 44. End effector 22 generally includes a second or lower jaw member 42. In some embodiments, shaft members 12 and 14 of the mechanical forceps 20 may be designed to transmit a particular desired force to opposing inner-facing surfaces of the jaw members 42 and 44.

Examples of shaft member and end effector embodiments are disclosed in commonly assigned U.S. Pat. No. 6,277,117 entitled “OPEN VESSEL SEALING FORCEPS WITH DIS-

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POSABLE ELECTRODES”, commonly assigned U.S. Pat. No. 6,796,981 entitled “VESSEL SEALING SYSTEM”, commonly assigned U.S. Pat. No. 7,510,556 entitled “VESSEL SEALING INSTRUMENT”, and commonly assigned U.S. patent application Ser. No. 11/232,174 filed on Sep. 21, 2005, entitled “MECHANISM FOR DIVIDING TISSUE IN A HEMOSTAT-STYLE INSTRUMENT”.

Forceps **10** includes a cable assembly **62** configured to operably couple the forceps **10** to an electrosurgical power generating source **28**, e.g., a microwave or RF electrosurgical generator. Cable assembly **62** may be formed from a suitable flexible, semi-rigid or rigid cable, and may connect directly to the electrosurgical power generating source **28**. In some embodiments, the cable assembly **62** connects the forceps **10** to a connector **63**, which further operably connects the instrument **10** to the electrosurgical power generating source **28**. Cable assembly **62** may be internally divided into a plurality of conductors (e.g., **61a**, **61b**, **61c** shown in FIG. 2) configured to transmit electrosurgical energy through respective feed paths to the end effectors **22** and **24** and/or transmitting electrical signals to control delivery of electrosurgical energy and/or feedback signals to control the electrosurgical power generating source **28**.

Electrosurgical power generating source **28** may include any energy source, e.g., electrosurgical generator, suitable for use with electrosurgical devices, and may be configured to provide ultrasound, radiofrequency (RF), microwaves, laser energy and/or various frequencies of electromagnetic energy. Examples of electrosurgical generators that may be suitable for use as a source of electrosurgical energy are commercially available under the trademarks FORCE EZ™, FORCE FX™, SURGISTAT™ II, and FORCE TRIAD™ offered by Covidien. Cable assembly **62** may additionally, or alternatively, provide a conduit (not shown) configured to provide coolant fluid from a coolant source (not shown) to one or more components of the forceps **10**. Forceps **10** may alternatively be configured as a wireless device and/or battery powered.

As shown in FIGS. 1 and 2, clip-over assembly **50** is designed to work in combination with the mechanical forceps **20**. Clip-over assembly **50** is designed to clip around the mechanical forceps **20** from the side and includes a disposable body **56** configured to releaseably engage one of the shaft members, e.g., **14**, of the mechanical forceps **20**. In some embodiments, as shown in FIG. 2, disposable body **56** includes a first disposable member **57**, a second disposable member **58** and a third disposable member **59**, wherein the second disposable member **58** is coupled to the first disposable member **57** to cooperatively define a tab portion **53**, and the third disposable member **59** is coupled to the first disposable member **57** to cooperatively define a chamber “C”, wherein the chamber “C” is disposed in communication with an opening “O” defined by the second disposable member **58** and the third disposable member **59**. Tab portion **53** is configured to accommodate the switch assembly **100** therein and suitably shaped to fit within the region “R” (FIG. 1) defined between the opposing shaft portions **12** and **14**.

First disposable member **57**, the second disposable member **58** and/or the third disposable member **59** may include a plurality of mechanical interfaces disposed at various positions along their respective interiors to effect mechanical engagement with one another. In some embodiments, either male or female mechanical interfaces or a combination of mechanical interfaces may be disposed within the second disposable member **58** and/or the third disposable member **59** with mating mechanical interfaces disposed on or within the first disposable member **57**. First disposable member **57**, second disposable member **58** and the third disposable mem-

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ber **59** may be assembled together with the aid of alignment pins, detents, snap-like interfaces, tongue and groove interfaces, locking tabs, adhesive ports, etc., utilized either alone or in combination for assembly purposes. Any suitable joining method may be used to attach (or clip, connect, couple, fasten, secure, etc.) the second and third disposable members **58**, **59** to the first disposable member **57**. In alternative embodiments not shown, the first disposable member **57** and the third disposable member **59** are integrally formed as a single unitary body by a suitable molding process, such as injection molding.

First disposable member **57**, the second disposable member **58**, and the third disposable member **59** may be formed in whole or in part of any suitable electrically non-conductive material, e.g., a suitable polymeric or ceramic material. In some embodiments, the first disposable member **57**, the second disposable member **58** and/or the third disposable member **59** are formed at least in part from a rigid material, such as polyamide or other plastic, or a composite material having low electrical conductivity, e.g., glass-reinforced polymers. In some embodiments, the first disposable member **57**, the second disposable member **58** and/or the third disposable member **59**, or portions thereof, may be formed from metal, thermoplastic, e.g., polycarbonate, composites, e.g., plastic-metal or ceramic-metal composites, or other materials.

As shown in FIG. 2, first disposable member **57** includes a first wall portion **51** and a second wall portion **52**. First wall portion **51** defines a first aperture **71** therethrough and a first cavity **76** associated with the first aperture **71**. First cavity **76** is configured to receive therein a first portion (e.g., **46** shown in FIGS. 2 and 4) of the switch assembly **100**. Second disposable member **58** includes a body **54** defining a second aperture **74** therethrough and a second cavity **78** associated with the second aperture **74**. Second cavity **78** is configured to receive therein a second portion (e.g., **48** shown in FIGS. 2 and 4) of the switch assembly **100**. Third disposable member **59** includes a third wall portion **55**. Third wall portion **55** of the third disposable member **59** and the body **54** of the second disposable member **58** are adapted to cooperatively define an opening “O” configured to allow one of the shaft members, e.g., **14**, of the mechanical forceps **20** to pass therethrough. Third wall portion **55** of the third disposable member **59** and the second wall portion **52** of first disposable member **57** are adapted to cooperatively define a chamber “C” configured to receive therein at least a portion of one of the shaft members, e.g., **14**, of the mechanical forceps **20**, wherein chamber “C” is disposed in communication with the opening “O”. In some embodiments, at least a portion of the cable assembly **62** is housed within the clip-over assembly **50**.

Although the clip-over assembly **50** is adapted to releaseably-engage the mechanical forceps **20**, bipolar forceps **10** can be manufactured wherein the clip-over assembly **50** may be permanently or semi-permanently affixed to the mechanical forceps **20** by any suitable process including without limitation mechanical fasteners, grooves, flanges, adhesive bonding, welding processes, e.g., laser welding, mechanical interlock, snaps, bent tabs, or other suitable joining method may be used to attach (or clip, connect, couple, fasten, secure, etc.) the clip-over assembly **50** to the mechanical forceps **20**.

As cooperatively shown in FIGS. 1 and 2, switch assembly **100** includes a user-actuable button “B” including two user-accessible contact areas **4a** and **4b** (e.g., disposed on opposite sides of the mechanical forceps **20**) configured to allow finger actuation of a switch “S”. Switch “S” may include any suitable switch, e.g., a joystick switch or other control mechanism, and may be disposed in operative communication with

a source of electrosurgical energy **28** and/or a processor unit (not shown) configured to control delivery of electrosurgical energy to the forceps **10**.

In some embodiments, as shown in FIGS. **3** and **4**, contact areas **4a** and **4b** may include one or more features, e.g., protrusions or contact bumps **41** raised on the face of the contact areas **4a** and **4b**, to increase operability and/or enhance ease-of-use of the button “B”. The shape, size and spacing of individual contact bumps **41** may be varied from the configuration depicted in FIGS. **3** and **4**.

As shown in FIGS. **3** and **4**, switch assembly **100** includes a connector member **30** adapted to operably couple the button “B” and the switch “S”. Connector member **30** includes a post member “P” operably associated between the button “B” and the switch “S”. As shown in FIG. **3**, post member “P” includes a post body **32** including two prong-like portions **34** and **36** extending outwardly from the connector member **30**. Connector member **30** includes a first connector portion **31** disposed to place the contact areas **4a** and **4b** in operative association with the post body **32**, and may include a second connector portion **33** disposed to place the post body **32** in operative association with the switch “S”. In some embodiments, the post body **32** bisects or otherwise divides the connector member **30** into the first connector portion **31** and the second connector portion **33**.

In some embodiments, button “B” includes a flange **45** disposed in association with the first and second contact areas **4a** and **4b**. Flange **45** is configured to facilitate positioning of the button “B”, and may be adapted to reduce fluid egress, e.g., to reduce the likelihood of damage to the switch “S” due to fluid egress. In some embodiments, flange **45** is configured to facilitate positioning of the first user-accessible contact area **4b** relative to the first aperture **71** and positioning of the second user-accessible contact area **4a** relative to the second aperture **74**.

As shown in FIG. **3**, connector portion **30** defines a first axis “A₁-A₁” along the longitudinal direction of the connector portion **30**, and a transverse or second axis “A₂-A₂” perpendicular thereto. Post body **32** defines a third axis “A₃-A₃” along the longitudinal direction of the post body **32**, wherein the third axis “A₃-A₃” is at least substantially parallel to the second axis “A₂-A₂”. Button “B” is selectively actuatable by depression of one or both of the contact areas **4a**, **4b** to cause movement of the post body **32** relative to the second axis “A₂-A₂”, which, in turn, allows selective activation of the switch “S”.

In some embodiments, switch assembly **100** is adapted to preclude activation of the switch “S” if the applied force to one or both of the contact areas **4a**, **4b** does not result in deflection of the third axis “A₃-A₃” by at least a predetermined angle (e.g., relative to the second axis “A₂-A₂”), e.g., to avoid or reduce unintended activation of the switch “S”. In some embodiments, when user-applied force to one or both of the contact areas **4a**, **4b** causes movement of the first connector portion **31** resulting in deflection of the third axis “A₃-A₃” by at least a predetermined angle (e.g., relative to the second axis “A₂-A₂”), the resultant movement of the second connector portion **33** results in activation of the switch “S”.

Hereinafter, methods of manufacturing a clip-over disposable assembly in accordance with the present disclosure are described with reference to FIGS. **5** and **6**. It is to be understood that the steps of the methods provided herein may be performed in combination and in a different order than presented herein without departing from the scope of the disclosure.

FIG. **5** is a flowchart illustrating a method of manufacturing a clip-over disposable assembly **50** according to an embodi-

ment of the present disclosure. In step **510**, a switch assembly **100** is provided. Switch assembly **100** includes a user-actuatable button “B” including two user-accessible contact areas **4a** and **4b**.

In step **520**, first and second disposable members **57**, **58** are provided. The first and second disposable members **57**, **58** are configured to form an internal chamber **76**, **78** when coupled together. The chamber **76**, **78** is configured to accommodate at least a portion **46**, **48** of the switch assembly **100** therein. The first and second disposable members **57**, **58** may be formed in whole or in part of any suitable electrically non-conductive material, e.g., a suitable polymeric or ceramic material.

In step **530**, the second disposable member **58** is coupled to the first disposable member **57**, wherein a first portion **4b** of the user-actuatable button “B” is disposed in association with an outer peripheral surface of the first disposable member **57** and a second portion **4a** of the user-actuatable button “B” is disposed in association with an outer peripheral surface the second disposable member **58**. Any suitable joining method, e.g., ultrasonic welding, may be used to couple the second disposable member **58** to the first disposable member **57**.

In step **540**, a third disposable member **59** is provided. Third disposable member **59** includes a wall portion **55** configured to form a chamber “C” when the first and third disposable members **57**, **59** are coupled together. The chamber “C” is configured to receive therein at least a portion of a shaft **14** of a hemostat-style surgical instrument **20**.

In step **550**, the third disposable member **59** is coupled to the first disposable member **57**. In some embodiments, one or more conductors (e.g., three conductors **61a**, **61b**, **61c**) suitable for transmitting electrosurgical energy through respective feed paths to end effectors **22** and **24** of an instrument **20** and/or electrical signals to control delivery of electrosurgical energy and/or feedback signals to control a source of electrosurgical energy **28** are over-molded prior to coupling the third disposable member **59** to the first disposable member **57**, in step **550**.

FIG. **6** is a flowchart illustrating a method of manufacturing a clip-over disposable assembly **50** according to an embodiment of the present disclosure. In step **610**, a switch assembly **100** is provided.

Switch assembly **100** includes a user-actuatable button “B” including first and second user-accessible contact areas **4a** and **4b**. In some embodiments, the switch assembly **100** also includes a post member **30** including a post body **32**, wherein the post body **32** defines a longitudinal axis “A₃-A₃” transverse to the longitudinal axis “A₁-A₁” of the connector member **30**. In some embodiments, the post body **32** bisects or otherwise divides the connector member **30** into a first connector portion **31** and a second connector portion **33**.

In step **620**, a first disposable member **57** is provided. First disposable member **57** includes first and second wall portions **51** and **52**, respectively. The first wall portion **51** defines a first aperture **71** therethrough and a first cavity **76** associated with the first aperture **71**. The first cavity **76** is configured to receive therein a first portion **46** of the switch assembly **100**.

In step **630**, a second disposable member **58** is provided. Second disposable member **58** includes a body **54** defining a second aperture **74** therethrough and a second cavity **78** associated with the second aperture **74**. The second cavity **78** is configured to receive therein a second portion **48** of the switch assembly **100**.

In step **640**, the first portion **46** of the switch assembly **100** is positioned into the first cavity **76**. The first user-accessible contact area **4b** may be disposed in association with the first aperture **71**.

In step 650, a second portion 48 of the switch assembly 100 is positioned into the second cavity 78. The second user-accessible contact area 4b may be disposed in association with the second aperture 74.

In step 660, the second disposable member 58 is coupled to the first disposable member 57. Any suitable joining method, e.g., ultrasonic welding, may be used to couple the second disposable member 58 to the first disposable member 57.

In step 670, a third disposable member 59 is provided. Third disposable member 59 includes a third wall portion 55.

In step 680, the third disposable member 59 is coupled to the first disposable member 57, wherein the third wall portion 55 and the second wall portion 52 cooperatively define a chamber "C" configured to receive therein at least a portion of a shaft 14 of a hemostat-style surgical instrument 20.

The above-described clip-over disposable assembly embodiments including a switch assembly and a disposable body configured for side-mounting onto a hemostat-style surgical instrument are suitable for use with various types of hemostat-style surgical instruments, such as without limitation, electrosurgical forceps, and may be suitable for a variety of uses and applications. Embodiments may be used in conjunction with electrosurgical devices suitable for use with open and/or laparoscopic surgical procedures.

The above-described methods of manufacturing a clip-over disposable assembly may be used in conjunction with a variety of electrosurgical devices adapted for treating tissue, such as bipolar electrosurgical forceps, monopolar electrosurgical forceps, and other hemostat-style surgical instruments. The above-described methods designed for ease of assembly a clip-over disposable assembly including a switch assembly and a disposable body configured for side-mounting onto a hemostat-style surgical instrument are suitable for use with a variety of types of hemostat-style surgical instruments.

Although embodiments have been described in detail with reference to the accompanying drawings for the purpose of illustration and description, it is to be understood that the inventive processes and apparatus are not to be construed as limited thereby. It will be apparent to those of ordinary skill in the art that various modifications to the foregoing embodiments may be made without departing from the scope of the disclosure.

What is claimed is:

1. A clip-over assembly suitable for use with a surgical instrument, the clip-over assembly comprising:
 - a switch assembly including a switch; and
 - a body configured to mount onto a shaft of the surgical instrument, the body including:
 - a first member having a first aperture defined therethrough, the first aperture defining a first cavity configured to receive a first portion of the switch assembly;
 - a second member having a second aperture defined therethrough, the second aperture defining a second cavity configured to receive a second portion of the switch assembly; and
 - a third member cooperating with the second member to define an opening configured to allow the shaft of the surgical instrument to pass therethrough, the first member and the third member cooperating to define a chamber in communication with the opening configured to receive a portion of the shaft of the surgical instrument from an off-axis position.
2. The clip-over assembly of claim 1, wherein the switch assembly further includes a user-actuatable button including first and second user-accessible contact areas.

3. The clip-over assembly of claim 2, wherein the first user-accessible contact area is disposed in association with the first aperture and the second user-accessible contact area is disposed in association with the second aperture.

4. The clip-over assembly of claim 3, wherein the first user-accessible contact area includes a flange associated therewith configured to facilitate positioning of the first user-accessible contact area relative to the first aperture.

5. The clip-over assembly of claim 3, wherein the second user-accessible contact area includes a flange associated therewith configured to facilitate positioning of the second user-accessible contact area relative to the second aperture.

6. The clip-over assembly of claim 2, wherein the switch assembly further includes a connector member adapted to operably couple the button and the switch, the connector member defining a longitudinal axis.

7. The clip-over assembly of claim 6, wherein the connector member includes a post member operably associated between the user-actuated button and the switch.

8. The clip-over assembly of claim 7, wherein the post member includes a post body defining a longitudinal axis transverse to the longitudinal axis of the connector member.

9. The clip-over assembly of claim 8, wherein the connector member includes a first connector portion disposed to place the first and second contact areas in operative association with the post body.

10. The clip-over assembly of claim 9, wherein the connector member further includes a second connector portion disposed to place the post body in operative association with the switch.

11. The clip-over assembly of claim 1, wherein the first, second, and third members are disposable.

12. An electrosurgical instrument, comprising:

a clip-over assembly attachable to the electrosurgical instrument, the clip-over assembly including:

a switch assembly;

a first member including a first aperture defined therethrough, the first aperture defining a first cavity configured to receive a first portion of the switch assembly;

a second member including a second aperture defined therethrough, the second aperture defining a second cavity configured to receive a second portion of the switch assembly; and

a third member cooperating with the second member to define a chamber configured to receive at least a portion of a shaft of the electrosurgical instrument.

13. The electrosurgical instrument of claim 12, wherein the electrosurgical instrument is a hemostat-style surgical instrument adapted to direct energy to tissue.

14. The electrosurgical instrument of claim 12, wherein the electrosurgical instrument is a mechanical forceps.

15. The electrosurgical instrument of claim 12, further comprising a cable assembly adapted to connect to a source of electrosurgical energy.

16. The electrosurgical instrument of claim 12, wherein the first, second, and third members are disposable.

17. A method of manufacturing a clip-over assembly, comprising:

providing a switch assembly;

providing first and second members configured to form an internal chamber, the chamber configured to accommodate at least a portion of the switch assembly therein;

coupling the second member to the first member, wherein a first portion of the switch assembly is disposed in association with an outer peripheral surface of the first

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member and a second portion of the switch assembly is disposed in association with an outer peripheral surface the second member;

providing a third member configured to cooperate with the first member to define a chamber configured to receive at least a portion of a shaft of a surgical instrument; and coupling the third member to the first member. 5

18. The method of manufacturing a clip-over assembly of claim 17, wherein the surgical instrument is a hemostat-style surgical instrument adapted to direct energy to tissue. 10

19. The method of manufacturing a clip-over assembly of claim 17, wherein the switch assembly includes an integral joystick switch.

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